

REMARKS

This response is intended as a complete response to the Office Action dated February 13, 2007. In view of the following discussion, the Applicants believe that all claims are in allowable form.

The Applicants thank Examiner Tran for his time and comments in a teleconference with Alan Taboada on April 11, 2007, during which a proposed claim amendment was discussed. The substance of the interview is accurately described in the Examiner-provided Interview Summary dated April 13, 2007.

CLAIM OBJECTIONS

Claims 35 and 39 stand objected to due to lack of clarity. Specifically, the Examiner believes that the phrase, "further comprising," appearing in each of the above claims should be replaced with the term, "wherein." In response, the Applicants have amended claims 35 and 39 to clarify the claims as suggested by the Examiner.

CLAIM REJECTIONS

A. 35 USC §112 Claims 12, 17, 19

Claims 12, 17 and 19 stand rejected under 35 USC §112, 2nd paragraph, as being indefinite for failing to particularly point out and distinctly claim the invention. In response, the Applicants have amended claims 12, 17, and 19 to more clearly recite aspects of the invention.

Specifically, claim 12 has been amended to clarify to which limitation the flow ratio of claim 12 applies. Claim 17 has been amended to depend from claim 1, thereby removing the uncertainty as to the gas pressure limitation. Claim 19 has been amended to depend from claim 8, thereby removing the uncertainty as to the gas pressure limitation.

Thus, the Applicants submit that claims 12, 17, and 19 comply with the requirements of 35 USC §112, 2nd paragraph and are patentable thereunder. Accordingly, the Applicants respectfully request the rejection be withdrawn and the claims allowed.

B. 35 USC §103 Claims 1-8, 11-12, 17-18, 21-23, 26-30 and 35-42

Claims 1-8, 11-12, 17-18, 21-23, 26-30 and 35-42 stand rejected under 35 USC §103(a) as being unpatentable over United States Patent 5,545,289, issued August 13, 1996 to *Chen, et al.* (hereinafter *Chen*) in view of United States Patent 6,652,713, issued May 13, 2003 to *Belyansky, et al.* (hereinafter *Belyansky*). Accordingly, the Applicants have amended claims 1 and 21 to more clearly recite aspects of the invention.

Chen teaches a process performed on a partially processed substrate 20 having etched metal-containing features 22 and further having etchant byproducts 24, remnant resist 26, and sidewall deposits 27. (*Chen*, col. 4, ll. 45-51.) The sidewall deposits 27 comprise organic compounds containing carbon and hydrogen, metal from the metal-containing layers, such as aluminum, and etchant species such as boron and nitrogen. (*Id.*, col. 5, ll. 16-22.) *Chen* teaches that the exact composition may vary depending upon, *inter alia*, the chemical composition of the metal-containing layers. (*Id.*, col. 5, ll. 22-25.) *Chen* teaches a multi-step plasma stripping and passivation process to strip the remnant resist and remove etchant byproducts from the substrate. (See, *Id.*, col. 7, ll. 34-44.)

However, *Chen* fails to teach or suggest heating the etched substrate to a temperature of at least 50°C in a non-plasma gas mixture comprising oxygen and nitrogen, and exposing the heated substrate to a plasma that removes the halogen-containing residue, as recited in claims 1 and 21.

Belyanski is cited to show etching polysilicon with bromine and removing subsequent bromine etch residue by exposure to an oxygen plasma. However, *Belyanski* fails to teach or suggest heating the etched substrate to a temperature of at least 50°C in a non-plasma gas mixture comprising oxygen and nitrogen, and exposing the heated substrate to a plasma that removes the halogen-containing residue, as recited in claims 1 and 21. As such, any combination of *Belyanski* and *Chen* would still fail to teach or suggest a process that would result in the limitations recited in the claims. Therefore, a *prima facie* case of

obviousness has not been established as the combination of the cited references fails to yield the limitations recited in the claims.

Thus, independent claims 1 and 21, and claims 2-8, 11-12, 17-18, 22-23, 26-30 and 35-42, respectively depending therefrom, are patentable over *Chen* in view of *Belyansky*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

C. 35 USC §103 Claim 25

Claim 25 stands rejected under 35 USC §103(a) as being unpatentable over *Chen* in view of *Belyanski* as applied to claim 21, and further in view of United States Patent 6,133,102, issued October 17, 2000 to *Wu* (hereinafter *Wu*). The Applicants respectfully disagree.

Independent claim 21, from which the above-rejected claim depends, recites limitations not taught or suggested by any permissible combination of the prior art. The patentability of claim 21 over *Chen* and *Belyansky* is discussed above.

Wu is cited to show etching a polysilicon layer using CF_4 in addition to hydrogen gas. However, *Wu* fails to teach or suggest a modification of the teachings of *Chen* and *Belyansky* in a manner that would yield providing a substrate having a polysilicon layer on the substrate; etching the polysilicon layer and forming a halogen-containing residue comprising at least one of chlorine or bromine on the substrate; heating the substrate to a temperature of at least 150°C in a non-plasma gas mixture comprising oxygen and nitrogen; and exposing the heated substrate to a plasma that removes the halogen-containing residue, as recited in claim 21. Therefore, a *prima facie* case of obviousness has not been established as the combination of the cited references fails to yield the limitations recited in the claim.

Thus, claim 25 is patentable over *Chen* in view of *Belyansky* and further in view of *Wu*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claim allowed.

ALLOWABLE SUBJECT MATTER

The Applicants thank the Examiner for his comments regarding the allowability of claims 9, 13-16, 20, and 31 if rewritten in independent form including all of the imitations of the base claim and any intervening claims. The Applicants further thank the Examiner for his comments regarding the allowance of claim 19 if rewritten to overcome the above rejection under 35 USC §112 and to include all of the imitations of the base claim and any intervening claims.

Accordingly, the Applicants have added new claims 43-50 to the application. New claims 43-50 substantially correspond to the allowed claims, amended to clarify aspects of the invention. The Applicants respectfully submit that new claims 43-50 remain in allowable form. Specifically, the Applicants submit that the combination of the cited art fails to teach or suggest providing an etched substrate having a halogen-containing residue, comprising at least one of chlorine or bromine, formed during etching of a polysilicon layer of the substrate; heating the etched substrate to a temperature of at least 50°C; and exposing the heated substrate to a plasma that removes the halogen-containing residue, wherein the plasma comprises hydrogen, water vapor, oxygen, and nitrogen, as recited in claim 43; or providing a substrate having a polysilicon layer on the substrate; etching the polysilicon layer and forming a halogen-containing residue comprising at least one of chlorine or bromine on the substrate; heating the substrate to a temperature of at least 50°C; and exposing the heated substrate to a plasma that removes the halogen-containing residue, wherein the plasma comprises hydrogen, water vapor, oxygen and nitrogen, as recited in claim 50.

The Applicants submit that these claims are supported by the specification and that no new matter has been added. Accordingly, the Applicants respectfully request entry and allowance of these claims.

CONCLUSION

Accordingly, both further consideration of this application and its swift passage to issue are earnestly solicited. If, however, the Examiner believes that any unresolved issues still exist, it is requested that the Examiner telephone Alan Taboada at (732) 935-7100 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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